Assessing Children's Language Development: A Systematic Literature Review on Early Language Milestone Scales

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ABSTRACT

Early language milestone (ELM) scales are used to assess language development in young children, especially for early detection of atypical language development. However, not all ELM scales are layperson-friendly and are suitable for all language acquirers. Therefore, this article presents a systematic literature review (SLR) of the existing ELM scales. This SLR used the PICo approach to select and review past studies ranging from 2013 to 2023, investigating the language(s), the target groups, and the constructs and items of existing ELM scales. Past studies on ELM scales were identified via the PRISMA approach from four online databases, namely, Scopus, PubMed, Web of Science, and Science Direct. From a total of 892 studies, only 19 studies were systematically reviewed; they cover ELM scales in 18 languages and language varieties which have been proven to be reliable and valid. Generally, the results show that the existing ELM scales can be used to assess children's language development in terms of receptive and expressive language skills from an early age. The findings show that the ELM scales were primarily developed to gauge the language development of children acquiring English as their first and/or second language; however, no ELM scale has been developed to meet the needs of children acquiring English and Malay as their first languages in the Malaysian context. This SLR directs future research on developing an ELM scale for Malay-English bilingual first language acquirers.

Keywords: early language milestone scale; language tool; children's language development; receptive language skills; expressive language skills

INTRODUCTION

The use of screening methods to monitor children's development is debatable, and routine screening is not often a part of early childhood health surveillance. Although in Malaysia, regular check-ups, in which children's development is closely monitored at public health centres, are mandatory, monitoring that focuses on children's language development is not mandatory. As mentioned by Mohd Kassim and Mohamed (2019), Malaysia has implemented a child-screening programme since 2011; however, the screening primarily focuses on early detection and diagnosis

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of Autism Spectrum Disorder (ASD). The increased awareness of the widespread and harmful effects of adversity on children's health and development has led policymakers, child development experts, and other stakeholders to focus on screening children as the first step in preventing and reducing these negative impacts (Bartlett, 2020) to ensure that children can grow up with good childcare awareness. The responsibility of identifying and supporting these children falls on both educational and health services; however, as a result of over-reliance on clinical judgments only, physicians often miss issues related to children's behaviour and development (So & To, 2022). As language development is a significant part of child development, language screening on children has always been seen as essential for discovering any speech or language impairments early. Addressing language concerns early through early identification and intervention can help prevent future academic difficulties, improve social development, and promote general cognitive growth. Without language screening, these delays may go unrecognised, resulting in issues that are more difficult to resolve as the children grow older (Komesidou & Summy, 2020). This awareness includes screening the children via language screening scales/tools developed by experts (Sansavini et al., 2021).

Language scales first emerged in the mid-1960s (Zimmerman & Castilleja, 2005). With early childhood intervention programmes and preschool special education programmes in the 1970s and 1980s, the demand for a formal evaluation of children's language development increased (Zimmerman & Castilleja, 2005). In the past, attempts to improve developmental screening tools were made by The American Academy of Paediatrics (AAP's) Developmental Surveillance and Screening Policy Implementation Project involving 17 paediatric practices, Paediatric Improvement Partnerships, and initiatives from the Commonwealth Fund's Assuring Better Child Development (Hirai et al., 2018). However, Hirai and colleagues reported that, based on the data from the National Survey of Children's Health (NSCH) of the United States (US), the accessibility of developmental screening was lower than expected in 2007; less than one in five children received a complete developmental screening, and only three in five children between 2011 and 2012. Although the data focus on developmental screening in general, it is essential to note that language developmental screening is a crucial aspect that falls under general development screening. In Malaysia, for example, parents are provided with the 'pink book' (i.e. Child Health Record Book), which tracks a child's development, including health assessment (health surveillance), screening for health and developmental problems, initial guidance (health education), and immunisation records, from birth up until seven years old ("CHILD HEALTH 2021-2030 a National Framework to Reduce the Under-5 Mortality and Support Child Growth & Development," 2021). Regular screenings and check-ups are mandatory, to ensure a more structured and consistent approach to monitoring children's developmental milestones. However, this 'pink book', which is widely used in Malaysian government hospitals and healthcare centres, does not include language development as one of the health surveillances; it focuses mainly on ASD early detection (Mohd Kassim & Mohamed, 2019). Furthermore, the 'pink book' is filled in by the healthcare providers and not parents and/or caregivers, making them not parent- and/or caregiver-friendly.

Early Language Milestone Scale is "a standardized language screening instrument designed to provide physicians and other health care professionals with a rapid means of screening the language development of children less than 3 years of age" (Walker et al., 1989, p. 285). Coplan and Gleason's (1990) Early Language Milestone Scale (henceforth, ELM Scale), for example, is a developmental screening tool to evaluate language and speech in young children based on the normative data gained from Coplan et al.'s (1982) cross-sectional sample and the test-retest and

interobserver reliability which was conducted by Coplan and Gleason (1993). Coplan and Gleason's (1990) ELM Scale was developed for primary school practitioners (i.e., primary caretakers) in 1990 to screen children's speech and language development from birth to 36 months for the eloquence of speech. This scale consists of 41 items based on the cross-sectional data collected from a few healthcare specialists and paediatricians in response to their observations of children aged 0 to 36 months.

Later, Coplan and Gleason (1993) developed the second edition of the ELM Scale (ELM Scale-2), consisting of 43 items, to screen the prelinguistic utterances of infants under 12 months. The experts and/or healthcare practitioners administered this language screening test based on the parents' reports on their children's current developmental status via "Yes/No" questions. Among the typical questions asked were, "Does your child now …?" or "Did he or she ever, coo?" (Coplan & Gleason, 1990, p. 964). According to Chatterjee (2020), Coplan and Gleason's (1993) ELM Scale-2 is suitable for assessing the speech and language of children aged 1-3 years old because it is simple and only uses a pass-fail scoring method for the items. Three main areas of language aspects are covered in ELM Scale and the ELM Scale-2, namely, a) auditory expressive (based on content and intelligibility of a child's speech), b) auditory receptive (relating to sound and verbal commands), and c) visual (identification of gestures, imitation, and tracking). The Early Language Milestone Scales (ELMS and ELM Scale-2) by Coplan and colleagues are often preferred over other language screening tools for their comprehensive assessment, their early detection features, their ease of use, their high sensitivity and specificity, and their broad age range (Coplan & Gleason, 1993). Their comprehensive nature ensures that various aspects of language development, from as early as infancy, are assessed. This is important as early detection allows for timely interventions, which are crucial for improving long-term language outcomes.

THE NEED FOR ELM SCALE IN DIVERSE LINGUISTIC BACKGROUNDS

Monitoring children's language development from birth is crucial so that necessary actions, for example, to decide if a child needs a definitive diagnosis (Coplan & Gleason, 1993; Pathak & Sovani-Kelkar, 2023) and/or early language interventions (Law et al., 2017), or to decide if the child needs to improve their speech and language skills, can be taken so as to address potential atypical language development in children. Past studies (e.g., Coplan et al., 1982; Coplan & Gleason, 1993; Rescorla & Achenbach, 2002) have shown the use of Language Milestone Scales (LMS) among language pathologists and clinical specialists in clinical settings to observe language development of young children.

The use of language milestone scales has resulted in more tools to monitor child language development. Schmitt et al. (2017), for example, have established a language benchmark for children's language development whereas Alexandre et al. (2020) have developed a validated booklet to follow up on child language development. Revisiting existing language milestone scales is necessary as groups and community languages evolve. According to Sudry et al. (2022), "there are inconsistencies among different screening tools regarding normative attainment age of commonly evaluated milestones" (p. 2) due to the difference in the language acquisition settings, language(s), and ethnicities. These aspects will encourage the development of the variation in ELM scales so that differences in the variables mentioned above can be addressed (Rescorla & Achenbach, 2002).

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THE IMPORTANCE OF USER-FRIENDLY ELM SCALES

It is a well-known fact that the majority of ELM scales used in earlier research are intended for specialists or experts such as linguists, speech pathologists, and child psychiatrists (Coplan & Gleason, 1993; Ebert, 2017). The ELM scales are not layperson-friendly and cannot be used by parents and caregivers. Nevertheless, it is reported that there are existing ELM Scales that are developed for parents to report on their children acquiring English (e.g., the Language Development Survey (LDS) by Rescorla (1989)) and languages that are linguistically similar to English, such as Dutch and Spanish (e.g., Language Developmental Booklet by Alexandre et al. (2020)). Most of these existing early language milestone scales are for assessing the language milestones of 1- to 6-year-old monolingual children.

Ideally, ELM scales that we have today should be parent- and caregiver-friendly, as they are the ones who are in close contact with their child. Parents and/or caregivers should be the ones who directly assess and monitor their children's language, as language development for children begins at home from infancy (e.g. Mahmud & Salehuddin (2023); Sopata & Długosz (2022)). Davies et al. (2017) suggest that parents should form a partnership with speech and language therapists (SLT) to monitor and assess children's language development.

Despite the importance of parents and/or caregivers monitoring their child's language development, to the best of our knowledge, not all ELM scales are parent- and caregiver-friendly to enable them to identify any anomalies in their child's language. In addition, most of the ELM scales are language- and culture-specific and hence, are not suitable for different languages and cultures. According to Larson et al. (2020) and Gabbatore et al. (2023), despite the fact that many assessment procedures have been devised to assess varied language abilities in children, only a few language assessments are suitable for target groups with varying cultural and linguistic backgrounds. In addition, there is a lack of accessible and appropriate parental language assessment on bilingual children's language development (Aikens et al., 2020; Lust et al., 2014) and this should be addressed as more than half of the world's population is bilingual and multilingual (Giovannoli et al., 2020). Hence, this SLR aims to investigate the features of Early Language Milestone scales that have been used to monitor children's language development from the day they were born until before they go to school.

METHODOLOGY

REVIEW PROTOCOL – PRISMA

According to Moher et al. (2009), PRISMA (i.e., Preferred Reporting Items for Systematic Reviews and Meta-Analyses) which was developed by Moher et al. (2009) and Liberati et al. (2009) has been used in Systematic Literature Reviews (SLRs) as "a basis for reporting systematic reviews of other types of research, particularly evaluations of interventions" (Moher et al., 2009, p. 337). Therefore, the current SLR, which was conducted in July 2023, was guided by PRISMA.

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FORMULATION OF THE RESEARCH QUESTION

The process of conducting the current SLR began with the formulation of the research questions. To formulate the research questions, the PICo method (i.e., 'P' for Problem or Population, 'I' for Interest, and 'Co' for Context) was employed to systematically review the studies related to the usefulness of early language milestone scales in identifying problems in children's early language development.

TABLE 1. SLR research scope based on the application of PICo construction

Concept	Definition	SLR application
Population	Population of targeted group studied	Scientific research study on language screening on children that include various regions and societies.
Interest	Criteria of ELM scales	Existing ELM scales with various criteria, models, and number of items
Context	The particular setting or languages of ELM scales	Versions of ELM scales in various languages based on the targeted groups assessed.

Based on Table 1, following is the contextualised research questions for the current SLR using PICo:

(1) Which languages (Context) have their own Early Language Milestone Scale (ELM scale)?
(2) Who are the targeted subjects (Population) of the existing ELM scales?
(3) What are the constructs that are covered in the respective ELM scales (Interest), and how are the items presented for each construct?

SYSTEMATIC SEARCHING STRATEGIES

The systematic searching strategy of this paper was conducted based on three systematic phases, namely, 1) identification, 2) screening, and 3) eligibility. Then, a quality appraisal process was performed according to the adapted criteria proposed by Shaffril et al. (2021). Quality appraisal data are shown in Table 2.

TABLE 2. Quality appraisal for 19 studies

References	Selection bias	Performance bias	Detection bias	Reporting bias	Overall risk of bias
	Method used to determine the numbers of targeted groups	Measure used to blind participants and personnel and outcomes assessors.	Accuracy of measurement of outcomes.	Selective reporting, accuracy of reporting.	Lower/higher
Nair et al. (2013)	Low	High	Low	High	Higher
Greenwood et al. (2013)	High	High	Low	Low	Medium

Guiberson & Rodriguez (2014)	High	High	High	Medium	Higher
Gudmundsson (2015)	Low	Low	Low	Low	Lower
Şahli & Belgin (2017)	Low	High	Low	Low	Lower
Goh et al. (2017)	High	High	Low	Low	Medium
Lim & Lee (2017)	High	High	Low	Low	Medium
Gilkerson et al. (2017)	High	Medium	Low	Low	Medium
Washington et al. (2017)	High	Low	Low	Low	Lower
Bornman et al. (2018)	High	High	High	Low	Higher
Vehkavuori & Stolt (2018)	Low	Low	Low	Low	Lower
Weber et al. (2018)	Low	High	Low	Low	Lower
Buzhardt et al. (2019)	Low	High	Low	Low	Lower
Johnson et al. (2019)	High	Low	High	Medium	Higher
Hua et al. (2019)	Medium	High	Medium	Low	Medium
Visser-Bochane et al. (2020)	High	Low	Low	Low	Lower
Butt et al. (2021)	High	High	Low	High	Higher
Vehkavuori et al. (2021)	High	Low	Low	Low	Lower
Smolík & Bytešníková (2021)	Low	High	Low	Low	Lower

IDENTIFICATION

Three main keywords were identified based on the PICo approach: language, development, and children. To enhance the search strategy and screening, the keywords were varied by searching through the related terms, variations, and synonyms. Likewise, various keywords that are linked to the primary terms were used in the search process, namely, *language development, children's language, children's language development, early language development, children's early*

language development, language scale, language milestone, language milestone scale, early language milestone, and/or *early language milestone scale*.

The searching technique used the search string based on the selected databases, namely, Scopus, PubMed, Web of Science, and Science Direct. A total of 892 potential articles were initially identified from the selected databases from the searching efforts.

SCREENING

The screening process was performed in Scopus, PubMed, Web of Science, and Science Direct. Prior to that, the inclusion and exclusion criteria were determined to explore the relevant studies. The selection of studies was limited to ten years of study maturity, peer-reviewed articles and articles with empirical data, and articles published in Malay and English only. The selection criteria must be formulated vigorously to ensure the robustness of the following study selection as suggested by Dobinson and Dockrell (2021), and Mathers et al. (2024). The search strings are presented in Table 3 whereas the inclusion and exclusion criteria, namely, timeline (studies maturity), type of journal, and language area are presented in Table 4.

TABLE 3. Search string used in the selected database

Database	Search string
Scopus	TITLE-ABS-KEY (("language development" OR "children's language development" OR "early language development" OR “children’s early language development”) AND ("language scale" OR "language milestone" OR "language milestone scale" OR "early language milestone" OR "early language milestone scale"))
PubMed	((((((((((language development) OR (children's language development)) OR (early language development)) OR (children's early language development)) AND (language scale)) OR (language milestone)) OR (language milestone scale)) OR (early language milestone)) OR (early language milestone scale)) AND (typical language development)) AND (typically developing children)) NOT (atypical language development)) NOT (atypical developing children)
ScienceDirect	(("language development" OR "children's language development" OR "early language development" OR “children’s early language development”) AND ("language scale" OR "language milestone" OR "language milestone scale" OR "early language milestone" OR "early language milestone scale"))
Web of Science	TS = (("language development" OR "children's language development" OR "early language development" OR “children’s early language development”) AND ("language scale" OR "language milestone" OR "language milestone scale" OR "early language milestone" OR "early language milestone scale"))

TABLE 4. SLR inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Timeline (studies maturity)	2013-2023	2012 and earlier
Types of journals	Peer-reviewed articles and journal articles with empirical data	Review article, meta-analyses, chapter in a book, book, conference proceeding, etc.
Language of past studies published	English and Malay	non-English and non-Malay

Topic	Language developmental scales, children with typically developing language, typically language development	General behavioural and developmental scales, children with language impairment, developmental language disorder, atypical language development

ELIGIBILITY

Based on the research question, articles that focus on ELM scales for children under the age of six years old (Population), children's early language development and/or early language milestone scales (Interest), and those that focus on the availability and usefulness of ELM scale on children's early language development (Context) were identified. This allows the authors to develop the three research questions for the SLR mentioned earlier.

APPRAISAL OF QUALITY

To ensure the appraisal of quality, the selected articles were assessed based on the relevance of the studies, studies maturity and quality, and the relevance of the methods, data collection, analysis, and findings.

STUDY SELECTION

A total of 892 studies from the years 2013 to 2023 were obtained, and out of this, 132 studies were eliminated due to duplications. The remaining 760 studies were screened by titles, and 197 were screened by abstracts following the review. After abstract review, 140 studies were removed for not meeting the inclusion criteria. The remaining 57 studies were carefully assessed and examined by full text, and finally, 19 studies were selected based on this study's inclusion and exclusion criteria. Figure 1 illustrates the selection process.

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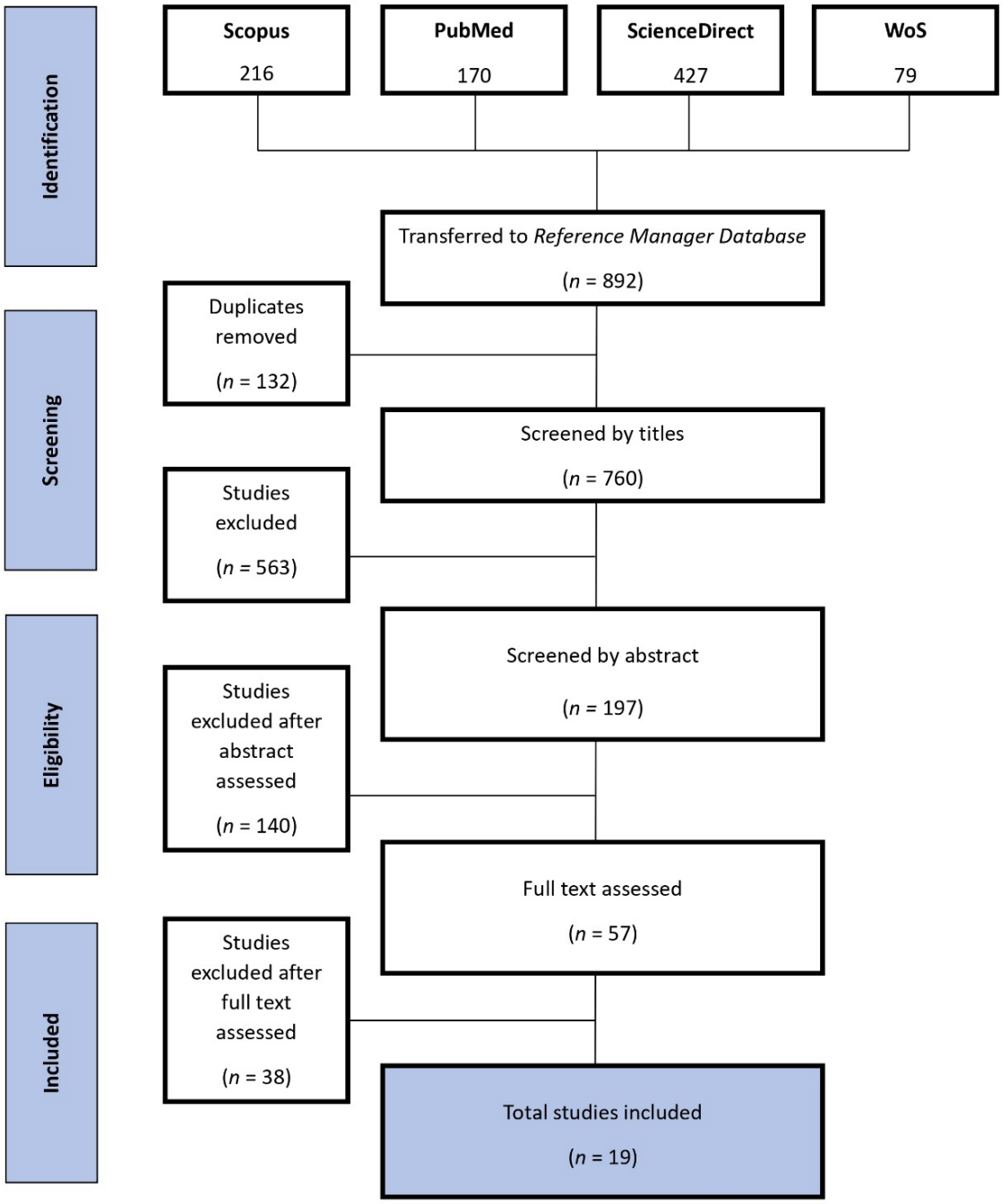

FIGURE 1. PRISMA flow chart showing the process of article screening and selection process for this SLR (n = number)

Studies were selected based on the predefined inclusion and exclusion criteria by all authors. All studies were carefully read and analysed based on the methods used for data collection, population, and the area of study. Guided by PRISMA (Figure 1) and based on PICo, the authors inspected the articles according to the usefulness of the respective early language milestone scales, assessment tools, research objectives, and outcomes.

DATA EXTRACTION AND ANALYSES

At this stage, the formulated research questions were addressed using the measures listed in Table 5. The information extracted covers (1) the name of existing ELM scales, (2) target groups (e.g., age group), and (3) the target languages.

The studies were sorted based on the year of publication, studies with empirical data, and the purpose of the study. Evaluation of data extraction and analyses were independently extracted by the authors based on the research questions. Thematic synthesis was utilised to analyse the data by deductively creating the theme through their similarities and relationships based on (1) the development of PRISMA protocol, (2) the formulation of research questions, (3) systematic searching strategies, (4) quality appraisal, (5) data extraction, (6) data synthesis; and (7) data demonstration (Shaffril et al., 2021). Table 5 presents the data extracted from the 19 studies.

TABLE 5. Summary of studies included on availability and usefulness of ELM scales

References	ELM scale	Target age group	No. of Participants	No. of Construct/ Items	ELM scale language	Assessed by
Nair et al. (2013)	The Language Evaluation Scale Trivandrum (LEST)	0;0 – 3;0	643	33 items	Malayalam	Health workers and/or independently by the mother (at home)
Greenwood et al. (2013)	The Early Communication Indicator (ECI)	0;6 – 3;6	2299	4 constructs	English	Early childhood service providers with the present of parents and/or caregivers to interact with the child.
Guiberson & Rodriguez (2014)	Spanish language-screening parent survey – based on Pilot INV-III & SPLS-4	3;0 – 5;11	107	59 items	Spanish	Both parents
Gudmundsson (2015)	The Toddler Language and Motor Questionnaire (TLMQ)	1;3 – 3;2	1132	144 items 2 constructs in 5 subtests: Gross Motor; Fine; Self Help; Language Comprehension; Language Expression	Icelandic	Mothers only

Şahli & Belgin (2017)	The Turkish Preschool Language Scale–5 (TPLS–5)	0;0 – 7;11	1320	2 standard scales: 3 constructs	Turkish (Türkiye)	Experts
Goh et al. (2017)	The Bayley Scales of Infant and Toddler Development–Third Edition (BSID-III)	0;0 – 6;0	459	3 subscales	English (Singapore)	Experts
Lim & Lee (2017)	The New Reynell Developmental Language Scales (NRDLS)	2;0 – 6;11	40	2 constructs – production and comprehension	Mandarin (Malaysia)	Experts
Gilkerson et al. (2017)	The Developmental Snapshot	0;3 – 3;4	308	52 items	English	Both parents
Washington et al. (2017)	The Intelligibility in Context Scale (ICS). The ICS–Jamaican Creole (ICS-JC)	3;3 – 6;3	145	7 items	Jamaican creole (Jamaica)	Parents and/or caregivers
Bornman et al. (2018)	The Mullen Scales of Early Learning (MSEL)	0;0 – 5;6	198	124 items 4 subscales	South African languages (Afrikaans, isiZulu, Setswana and South African English) (South Africa)	Clinicians and teachers
Vehkavuori & Stolt (2018)	The MacArthur Communicative Development Inventories (FinCDI-SF). The Communication and Symbolic Behaviour Scales, Developmental Profile, Infant-Toddler Checklist (FinCSBS)	2;0	78	FinCDI-SF – 2 constructs. FinCSBS – 24 items (3 constructs)	Finnish (Finland)	Both parents

Weber et al. (2018)	The Milestones Checklist; The Vocabulary Inventory	0;4 – 2;6	500	38	Wolof (Senegal)	Parents and/or caregivers
Buzhardt et al. (2019)	The Early Communication Indicator (ECI)	0;6 – 3;0	381	4 constructs: Gestures; Vocalizations ; Single words; Multiple words.	English (Australia)	Early childhood service providers with the present of parents and/or caregivers to interact with the child
Johnson et al. (2019)	The Parent Report of Children's Abilities– Revised (PARCA-R)	2;0 – 2;3	6402	2 subscales – 34 items (non-verbal cognition). A 100-word vocabulary checklist and 18 forced-choice items (sentence complexity)	English with translations available in fourteen other languages (in the UK)	Both parents
Hua et al. (2019)	The Bayley Scales of Infant and Toddler Development, Third Edition (Bayley-III)	0;0 – 3;6	1444	5 domains: Cognition, language (receptive and expressive communication); motor (gross and fine); social-emotional and adaptive behaviour	Chinese (China)	Both parents (observed by paediatricians)
Visser-Bochane et al. (2020)	The Early Language Scale (ELS) (Developing scale)	1;0 – 6;11	1381	26 items	Dutch	Both parents
Butt et al. (2021)	The Urdu Receptive Language Scale (URLS)	0;0 – 6;11	384	59 items	Urdu (Pakistan)	Experts

Vehkavuori et al. (2021)	The MacArthur Communicative Development Inventories (FinCDI-SF); The Reynell Developmental Language Scales III (RDLS-III)	2;0 & 5;0	66	FinCDI-SF: 89-word checklist for receptive and expressive lexical skills; 100-word checklist for expressive lexical skills (The Toddler version – for 2-year-old). RDLS: 2 parts – first part (lexical skills - understanding and naming objects and actions). second part (morphological and syntactic skills)	Finnish (Finland)	Both parents
Smolík & Bytešníková (2021)	Short questionnaire of children's vocabulary (SDDS)	1;6 – 3;6	200	40 items	Czech (Czech Republic)	Both parents

RESULTS

This SLR finds that the 19 ELM scales were developed in and/or for various languages; they focus on diverse cultures and communities to address the need to monitor children's language development globally. All of them focus on children between 0 and 7 years old.

The findings of this systematic review explain the general characteristics, languages, age, and number of participants reported in previous ELM scales. In general, the selected studies show an interesting trend (refer to Figure 2) in the number of studies over the years, with the number peaking between 2017 and 2018 with an average of 1.9 articles/year and 920 children/studies: a) 2013 – 2014 (Nair et al., 2013; Greenwood et al., 2013; Guiberson & Rodriguez, 2014), b) 2015 – 2016 (Gudmundsson, 2015), c) 2017 – 2018 (Goh et al., 2017; Gilkerson et al., 2017; Lim & Lee, 2017; Şahli & Belgin, 2017; Washington et al., 2017; Bornman et al., 2018; Vehkavuori & Stolt, 2018; Weber et al., 2018), c) 2019 – 2020 (Buzhardt et al., 2019; Hua et al., 2019; Johnson et al., 2019; Visser-Bochane et al., 2020), and e) 2021 – 2022 (Butt et al., 2021; Vehkavuori et al., 2021; Smolík & Bytešníková, 2021). The existing ELM scales and their criteria were then reviewed and are further discussed in the following subsections based on the formulated research questions.

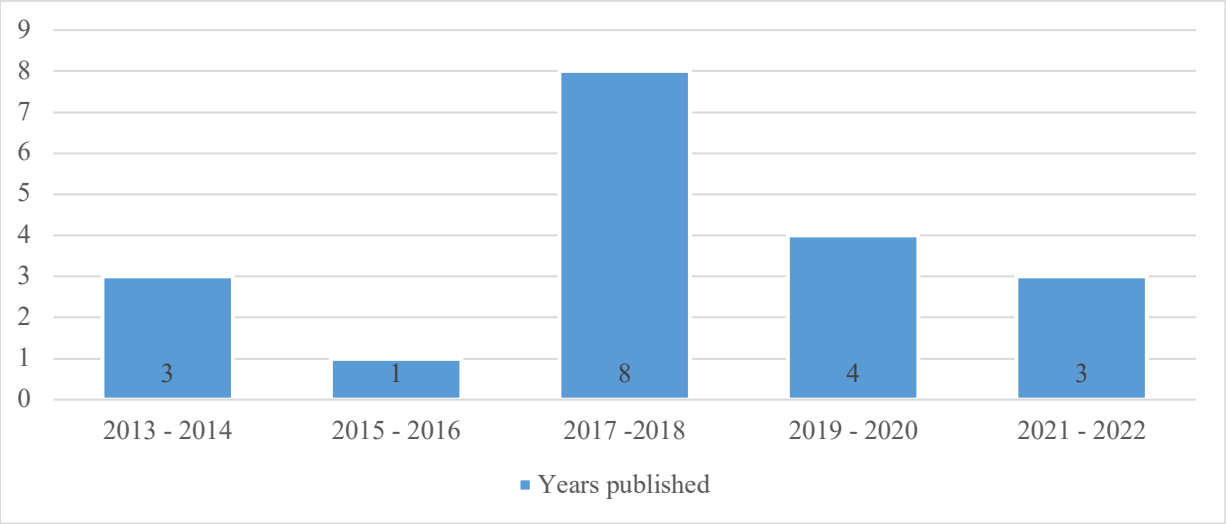

FIGURE 2. SLR trends from 2013 to 2023

LANGUAGES OF ELM SCALES

The current SLR has found that the researchers of the selected studies have developed and/or translated the ELM scales in various languages to accommodate the context and culture of the participants who grow up in different languages, nations, and communities. Out of the 19 ELM scales, two were designed for bilinguals (i.e. Goh et al., 2017) in English for Singaporean context; Washington et al. (2017) in Jamaican creole, whereas the rest were for monolinguals. Table 5 shows the languages in which the ELM scales were written. The languages used are based on the languages acquired by the children of each target group. The scales are written in 18 languages and language varieties, namely, English, Dutch, Urdu, Czech, Malayalam, Spanish, Finnish, Turkish, English (Singaporean), Mandarin, Chinese, Wolof, Jamaican Creole, Icelandic, and South African languages, namely Afrikaans, isiZulu, Setswana and South African English, to enable the experts and/or parents and/or caregivers from various linguistic backgrounds to assess the language development of their child.

Some of the studies (i.e., Bornman et al., 2018; Weber et al., 2018) used the ELM scales that were translated into their cultural language(s), namely, Wolof, Afrikaans, isiZulu, Setswana, and South African English to enable parents and/or caregivers who spoke those languages to use the scales. In addition, Goh et al. (2017) readapted items in different languages to enable the targeted parents and/or caregivers of multilingual speakers in Singapore to fully comprehend the ELM scales.

TARGETED GROUPS

AGE OF PARTICIPANTS

According to Visser-Bochane et al. (2020), and Greenwood et al. (2013), investigation on child language development should take place from a very young age as language acquisition and development begin way before children enter preschool; in fact, infants start to produce speech sounds as early as six months of age (starting with “cooing” and “babbling”). All 19 ELM scales

in this SLR focus on young children before preschool age, i.e., between 0-month-olds to 7-year-olds. This age range is important to prevent late identification of language delays in children as children are expected to have developed their receptive and expressive language skills rapidly in those age ranges. Studies from the current SLR (e.g., Butt et al., 2021; Goh et al., 2017; Şahli & Belgin, 2017; Weber et al., 2018) have shown that screening all newborns, toddlers, and young children (i.e., under six years of age) is necessary since anomalies in speech and language production and/or acquisition can be detected at a very early age. Figure 3 demonstrates the age groups of participants and the administration of the ELM scales in this SLR.

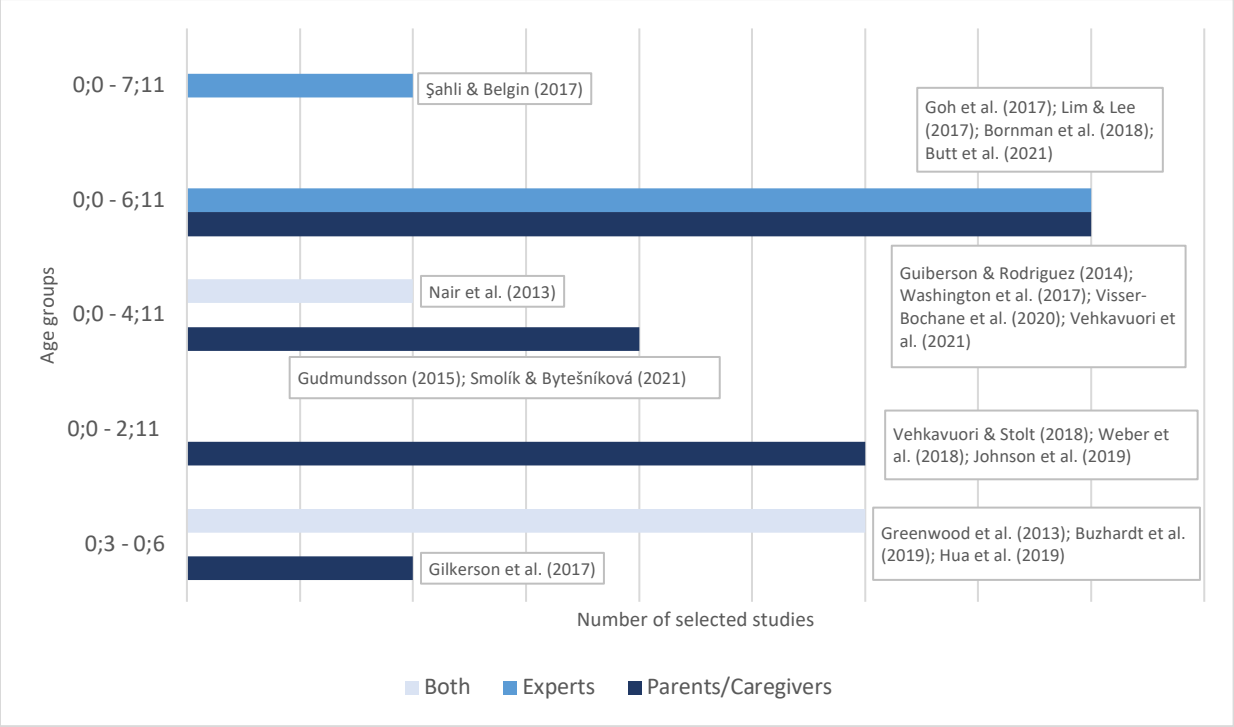

FIGURE 3. Age groups of participants

Figure 3 shows that almost all ELM Scales reviewed in this SLR were designed to monitor and/or screen the language development of children for a larger time span, i.e., beyond two years. Those designed by Greenwood et al. (2013), Gilkerson et al. (2017), Buzhardt et al. (2019), and Hua et al. (2019), however, are meant for infants between three months and six months old to address the short-term sensitivity of young children's growth in language. They, however, did not investigate newborns because they believe that children's growth in language cannot be observed before the age of three months.

NUMBER OF PARTICIPANTS

This SLR reports the language development of 17,487 children assessed by 19 EML scales from all 19 studies. The smallest number of children is 40, by Lim and Lee (2017), who monitored Malaysian Chinese children aged 2;0 to 6;11 using The New Reynell Developmental Language Scales-Mandarin (NRDLS-M). The largest number of children studied is 6,402 by Johnson et al. (2019), who monitored children aged 2;0 to 2;3 using The Parent Report of Children's Abilities–

Revised (PARCA-R) in the UK. Based on the method of participant recruitment, these authors employed the random and/or non-random sampling techniques by disseminating the information via email invitation, personal contacts and/or social media. The participants recruited in the studies were mainly from (1) childhood and healthcare programmes (Greenwood et al., 2013; Guiberson & Rodriguez, 2014; Goh et al., 2017; Buzhardt et al., 2019; Hua et al., 2019; Johnson et al., 2019), (2) parenting programmes (Weber et al., 2018), (3) hospital records (Şahli & Belgin, 2017), (4) learning/daycare centres (Lim & Lee, 2017; Washington et al., 2017; Bornman et al., 2018; Butt et al., 2021; Visser-Bochane et al., 2020), and (5) personal contact and/or social media (Gilkerson et al., 2017; Smolík & Bytešníková, 2021).

Some studies (i.e., Gudmundsson, 2015; Şahli & Belgin, 2017; Hua et al., 2019; Johnson et al., 2019) used random sampling methods that were reportedly to have a larger sample size (i.e., 1001 – 6000 participants). The range number of participants for each study is listed as follows: (1) less than 50 participants (Lim & Lee, 2017), (2) 51-100 participants (Vehkavuori & Stolt, 2018); Vehkavuori et al., 2021), (3) 101-300 participants (Guiberson & Rodriguez, 2014; Washington et al., 2017; Bornman et al., 2018; Smolík & Bytešníková, 2021), (4) 301-400 participants (Gilkerson et al., 2017; Buzhardt et al., 2019; Butt et al., 2021), (5) 401-500 participants (Goh et al., 2017; Weber et al., 2018), (6) 501-1000 participants (Nair et al., 2013), (7) 1001-3000 participants (Greenwood et al., 2013; Gudmundsson, 2015; Şahli & Belgin, 2017; Hua et al., 2019; Visser-Bochane et al., 2020), and (8) 3001-6000 participants (Johnson et al., 2019). All the selected participants were also reported to have good health conditions without known language disorders or and were not diagnosed with medical complications.

CONSTRUCTS AND ITEMS OF ELM SCALES

The 19 ELM scales were all developed with a similar aim, i.e., to assess language development in children below the age of seven. However, different terms were used by the selected studies to build the items and constructs due to various objectives, for example, to identify children with delayed language development, to demonstrate children's language growth and progress, to measure and evaluate children's language, and to assess children's language performance. For instance, the constructs and items of existing ELM scales were built according to a few criteria, namely, total of *n* items and *n* constructs, and categorisations of subtests and/or domain, standard scales, and subscales. Hua et al. (2019) and Gilkerson et al. (2017) categorised constructs as domain and subtest to draw the items related to development of speech and language such as vocal behaviour and preverbal communication). Study by Goh et al. (2017) and Şahli and Belgin (2017) used a standard scale (i.e., main scale for overall development) to construct the items because BSID-III and TPLS-5 are standardised assessment tools which comprised all areas of children's developmental areas, namely motor development, language development, and cognitive development. A subscale was used by Bornman et al. (2018) and Johnson et al. (2019) to construct items which comprised of interactive tasks focusing on language performance that can be completed by the children.

Figure 4 illustrates that the items and constructs for the ELM scales from the selected studies were (1) developed items based on observation from previous data provided by healthcare institutions on speech and language problems (i.e., Gudmundsson (2015); Gilkerson et al. (2017); Smolík & Bytešníková (2021); Butt et al. (2021); Visser-Bochane et al. (2020); (2) adapted from different previous developmental and/or speech and language assessment scales, tools and guidelines (i.e., Nair et al. (2013); Lim & Lee (2017); Weber et al. (2018); Johnson et al. (2019)));

(3) translated and adapted into the community languages studied based on the approval of the original developer (i.e., Guiberson & Rodriguez (2014); Washington et al. (2017); Şahli & Belgin (2017); Bornman et al. (2018); Hua et al. (2019) translated and adapted items)); and (4) standardised scales which were originally in English to assess children's language but in different settings (i.e., Greenwood et al. (2013); Goh et al. (2017); Buzhardt et al. (2019); Vehkavuori & Stolt (2018); Vehkavuori et al. (2021)).

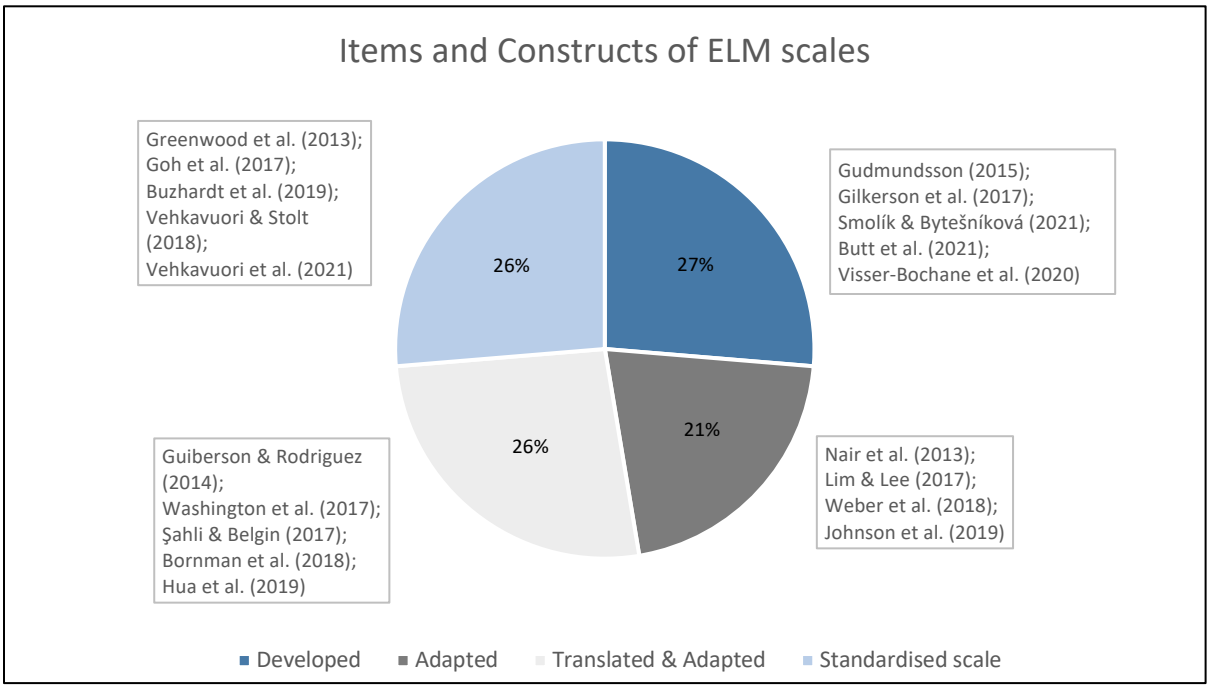

FIGURE 4. Items and constructs of selected studies

As shown in Figure 4, Visser-Bochane et al. (2020), Gudmundsson (2015), and Butt et al. (2021) developed their version of ELM scales without depending on the measures of other existing scales. They constructed their respective questionnaires based on a few criteria, such as the need to monitor children's language development, vocal behaviour and preverbal communication, and to facilitate parental monitoring in their speech communities, namely Iceland (Gudmundsson 2015), Dutch (Visser-Bochane et al., 2020), and Pakistan (Butt et al. 2021). However, other studies used items and constructs from the original English version of the language scale, which were translated into regional language(s), namely: (1) the Bayley-III cognitive scale in Chinese context (Hua et al. 2019), (2) Spanish – the Pilot Inventario-III (Pilot INV-III), a Spanish version of the MacArthur-Bates Communicative Development Inventory-III (CDI-III) (Guiberson & Rodriguez 2014), and (3) the Intelligibility in Context Scale (ICS) and ICS–Jamaican Creole for the Jamaican Creole context (Washington et al., 2017).

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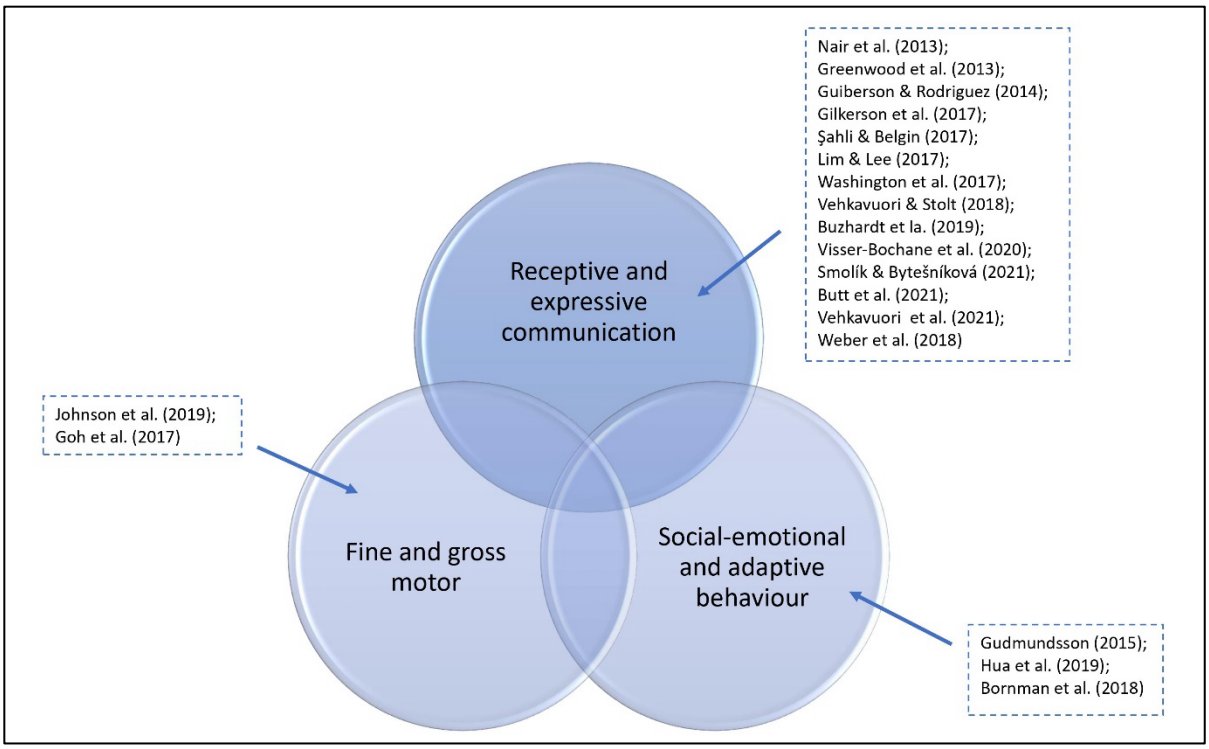

FIGURE 5. Constructs covered in the 19 studies

As shown in Figure 5, there are three constructs that are covered in the 19 studies. The items included in the constructs are language comprehension and production questions, namely (a) receptive and expressive language (e.g., answering questions and completing analogies), (b) fine and gross motor (e.g., recognising body parts and following commands), and (c) social-emotional and adaptive behaviour (e.g., matching, sorting, and nesting cups) in order to measure children's vocabulary and lexical abilities according to the measures below. These items, for instance, 'paying attention when listening', 'command following', 'understanding questions and instructions', and 'saying simple sentences' (Greenwood et al., 2013; Butt et al., 2021) are necessary to enable parents to assess their child's ability to understand and express the language components (Şahli & Belgin, 2017).

In summary, this SLR has shown that the existing ELM scales are written in 18 languages and language varieties, focus on 0- to 7-year-olds, and cover three major constructs. They are mainly designed for monolingual children and 12 of the 19 ELM scale are parent-friendly scales.

DISCUSSION

This Systematic Literature Review has assessed the existing ELM scales that have been used in monitoring and screening children's language development globally. The fact that the ELM scales are in 18 languages and language varieties suggests that children's language development has been getting a lot of attention globally. The absence of ELM scales from the South American continent in the current SLR could perhaps be due to the fact that the current SLR only covers articles that are written in English and Malay.

The current SLR demonstrates the awareness among researchers from various linguistic backgrounds regarding the need for and the importance of monitoring the language development of children from a very young age so as to identify children's language delay and impairment early. The fact that 63% of the ELM scales reported in this SLR were developed for parents and/or caregivers suggests the importance of involving parents and/or caregivers in monitoring their child's language development. This, however, does not mean that experts' evaluation is no longer needed; it actually means that parents and caregivers are now empowered with the scale that can enable them to detect any anomalies in their child's language development as early as possible from the comfort of their own home. When the anomalies are detected, parents and caregivers can immediately refer their child to experts, such as speech language pathologists, psychiatrists, or linguists, for further evaluation and possible intervention programmes. This was not possible before as most of the tools to identify language delay and impairment in children were mainly developed for experts; the terms used in the tools were not friendly to lay persons and that the items to be observed are unknown to parents and caregivers. Hence, by the time parents and caregivers notice any anomalies in their child's language development, it may already be a bit too late and intervention programmes may be more challenging for all parties. As a matter of fact, studies have shown that earlier detection or identification of speech and language disorder usually results in faster progress and that the child has a better chance to catch up with their same-age peers (Gilkerson et al., 2017; Butt et al., 2021).

Interestingly, among the 12 ELM scales designed for parents and/or caregivers, two of them were reported to be partially administered by the parents and/or caregiver, suggesting that experts and healthcare professionals must be present during the assessment period to monitor the language assessment. This, however, seems to restrict the ability of parents and/or other caregivers to assess their children's language development independently. Notably, parents and/or caregivers should be given the opportunity to assess their child's language independently, since parents and caregivers are the closest individuals to the children (Levickis et al., 2023) and that parents and/or caregivers spend more time with the children compared to the experts and healthcare professionals. The presence of the experts and healthcare professionals when the assessment is being done might not result in the best for the child as the child may be apprehensive by the presence of strangers. However, the presence of the experts and healthcare professionals when the assessment is being done may be necessary if the terms used in the ELM Scales are not lay person friendly.

This SLR has shown that ELM scales should be made easy to use repeatedly and can be accessed by the parents and/or caregivers easily (Visser-Bochane et al., 2020). By revisiting the development of the ELM scales, extensive language scales can be developed so that parents and/or caregivers may actively engage in their child's language development from an early stage (Davies et al., 2017; Pathak & Sovani-Kelkar, 2023). The current SLR also shows that out of the 19 ELM scales, only three were developed for children growing up as bilinguals (i.e., Goh et al., 2017; Lim & Lee, 2017; Washington et al., 2017). This suggests that there is a lack of ELM scales to monitor the language development of children growing up as bilinguals (and perhaps bilingual first language acquirers). Since there are more bilinguals (43%) than monolinguals (40%) in the world today (Giovannoli et al., 2020), there is a need for the development of ELM scales to monitor the language development of children growing up as bilinguals.

THE WAY FORWARD FOR FUTURE ELM SCALE RESEARCH

Based on the results and discussions earlier, it can be concluded that current and existing ELM scales may be not suitable for the use of Malaysian parents and/or caregivers to monitor their Malay-English bilingual children. Although in the results, concerns are seen regarding the need to monitor the language development of typically developing bilingual/multilingual children in their respective local languages, there has yet to be any ELM scale designed for Malaysian parents or caregivers to monitor the language development of their 1- to 6-year-old Malay-English bilingual children, particularly those acquiring Malay and English as their first languages. Hence, the need to do so is undoubtedly vital to ensure that Malaysian parents be empowered to assess their child's language development from an early age. As previously indicated, Washington et al. (2017), Goh et al. (2017), and Lim and Lee (2017) developed the ELM scales for bilingual children; however, they were not designed for use by Malaysian parents who wish to raise their children as Malay-English bilinguals. This is because, these studies (i.e., Goh et al., 2017; Lim & Lee, 2017; Washington et al., 2017) focuses on (a) age range 0;0 – 6;0 years old, and (b) bilinguals of Jamaican English-Jamaican Creole in Jamaica (Washington et al., 2017), English-Malay, English-Mandarin, English-Tamil in Singapore (Goh et al., 2017), and Mandarin-English in Malaysia (Lim & Lee, 2017) respectively. It is not known, however, whether the ELM scales are for bilingual first language acquirers or other types of bilinguals. Furthermore, the ELM scales in Goh et al. (2017) and Lim and Lee (2017) were designed for the experts to administer, making them unsuitable for Malaysian parents.

To facilitate the rapid development of and increasing awareness of monitoring bilingual children's language in Malaysia, this SLR leads to an opportunity to develop an early language milestone scale relevant to the language development of Malay-English bilingual children, particularly those acquiring Malay and English as their first languages. Other parent-friendly tools for bilinguals (such as those designed for English-Spanish or English-Chinese populations that take into account their structures in terms of language items, cultural considerations, and ease of use) can be used as references. Such an effort can help strengthen and uphold the Malay and English languages in Malaysia. As stated by Mahmud and Salehuddin (2023), the majority of Malaysians are raised to be Malay-English bilinguals; hence, access to an ELM scale that Malaysian parents and caregivers can use to monitor their child's language development themselves is necessary. Therefore, a future study that focuses on developing an ELM scale for Malaysian parents and caregivers who are raising their 1- to 6-year-old child as Malay-English bilinguals should be conducted. In conducting such a study, as directed by the current SLR, the following aspects should be considered:

(1) The parent-report questionnaire should be in both Malay and English languages since they are meant to monitor the language development of Malay-English bilingual children, whose parents or caregivers may be Malay and/or English bilinguals,
(2) The ideal number of participants recruited should be between, and average 1000 – 2000 covering all communities in a studied region,
(3) The possible constructs and items should cover children's receptive and expressive language skills and visual language skills, in terms of comprehension and production of language(s).

To materialise the construction of an ELM scale for Malay-English bilinguals, the existing bilingual ELM scales reviewed in this SLR can be used as a step-by-step guidance on how to create the scale. For example, Visser-Bochane et al.'s (2020) Early Language Scale (ELS), which is an

existing bilingual ELM scale, can be used as it shares certain criteria with the future ELM scale that will be developed for Malay-English bilinguals. This includes the fact that ELS is 1) a parent-friendly language scale, 2) a scale that is designed for bilinguals, and 3) a scale that uses standardised aspects in terms of language items, cultural considerations, and usability.

CONCLUSION

This SLR has presented a wide range of studies that utilised ELM scales for parents and/or caregivers and the health practitioners in speech and language to monitor language development in children. They emphasise the crucial role that parents and caregivers play in monitoring and promoting healthy language development in children so that early intervention, if required, can be provided. Therefore, the involvement and efforts of parents and caregivers are essential, not only for children's language development but also for their overall well-being. This SLR strengthens the idea that active participation by parents and caregivers is necessary for fostering robust language skills in children. One significant finding from this SLR is the potential need for an ELM scale specifically designed for parents and caregivers in Malaysia who have the intention to raise their children as Malay-English bilinguals. Given the bilingual phenomenon in Malaysia, a tailored ELM scale can help address the challenges that the parents and caregivers face to develop their children as bilinguals. Such a language scale would support parents and caregivers in making informed decisions about their children's language exposure and use, ensuring a balanced development of both Malay and English languages. Our follow-up publication will provide detailed descriptions on the development of an ELM scale that is tailored specifically for parents and/or caregivers in Malaysia who are raising their children as Malay-English bilinguals. This ELM scale will be parent- and/or caregiver-friendly, presented in both Malay and English, and will cover overall children's language development so that early intervention can be sought from healthcare professionals if the parents and/or caregivers themselves can detect any atypical development in their children from the comfort of their own homes.

However, this SLR has some limitations that should be acknowledged. This paper focuses exclusively on studies published in English and Malay, covering a span of ten years. This language and time constraints may have excluded relevant studies published in other languages or outside the specific period. Nonetheless, the decision to restrict the review to English and Malay papers was deliberately done, as these are the predominant languages spoken by the authors and the target population for future study on the Malay-English ELM scale. This focus ensures that the findings are directly practical and culturally relevant to the Malaysian setting, where Malay-English bilingualism is commonplace. While this limitation may restrict the generalisability of the results, it also enhances the specificity and practicality of the reviewed studies.

Furthermore, the systematic literature review covering a span of ten years was conducted to capture the most recent trends and development in ELM scale usage. However, language development practices and the language screening tools used to assess children's language evolve continuously, and newer studies may provide additional insights. Further research should consider extending the review period or including less recent studies to capture emerging practices and technological advancements in language screening tools and language assessment. Expanding the scope to include studies more than a span of ten years and from other languages and regions can also provide a broader prospective, offering valuable comparisons and insights into global trends in ELM scales and children's language development assessment and monitoring.

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